DID THE HARELIP SUCKER ONCE CALL MINNESOTA HOME?

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Of all the North American fishes, the Harelip Sucker (*Moxostoma lacerum*) (Figure 1) must be the epitome of intolerance to post-European settlement land-use practices. The systematic plowing of prairies and logging of forests caused unprecedented erosion and catastrophic siltation of once crystal-clear, pristine streams that sealed the Harelip's fate. The first Harelip Sucker was collected in 1859, it was described in 1877, and the last collection occurred in 1893. The species' known distribution encompassed eight states (Figure 2), which set and remains the infamous record for U.S. fish extinctions (Wikipedia Contributors 2016).

In early 2008, Dr. Dave Neely was working on his postdoctorate at the California Academy of Sciences. When he had a little free time, he was like a kid in a candy store checking out specimens in the fish collection. Two of his noteworthy finds include long-lost types of Shoshone Sculpin (*Cottus greenei*) and a Blotched Logperch (*Percina burtoni*) from Cypress Creek in Alabama. However, on one foray he noticed an old ground-glass jar. The label said, "SU 4436, *Placopharynx* (i.e., *Moxostoma*) *duquesnei*, Austin, Minn." However, the specimen that caught his eye was, without a doubt, not a Black Redhorse, but a Harelip Sucker! The Cedar River at Austin is over 400 air miles from the species' nearest known locality in Indiana! Dave described the specimen as, "Pretty good condition for its age; little mushy around the middle, fins mostly intact (caudal is bent up a bit, and right pelvic fin is split to the base), and the dorsal actually has some dark pigment left distally, darker than I've seen in other specimens" (Figure 3).

Dave identified the other two specimens in the jar as a Shorthead Redhorse (*M. macrolepidotum*), which is present in the Cedar River, but the third was yet another revelation. The jar label had indeed correctly pegged one specimen as a Black Redhorse, which has never been reported in the Minnesota reach of the river. It is no small miracle these specimens from the former Stanford University (SU) collection are extant today since much of the holdings were destroyed in the 1906 San Francisco earthquake and destructive fires that followed. The label neither listed collectors nor date so "Detective" Dave checked the accession ledger, but unfortunately soon realized almost all the early collections omitted these important details. Still, he made a very significant discovery that both Banded Killifish (*Fundulus diaphanus*) and Pugnose Shiner (*Notropis anogenus*) were also collected with the Harelip. These specimens have been lost, yet this adds two more species never reported from Minnesota's Cedar River.

Dave informed Dr. Robert (Bob) Jenkins who lit the wick to me with a news flash email, "Hey Kon, here's a */BOMB/* for you and others…" The "prime suspect" in this mystery was believed to be Seth Meek (Figure 4), who David Starr Jordan considered one of his "special students" and joined

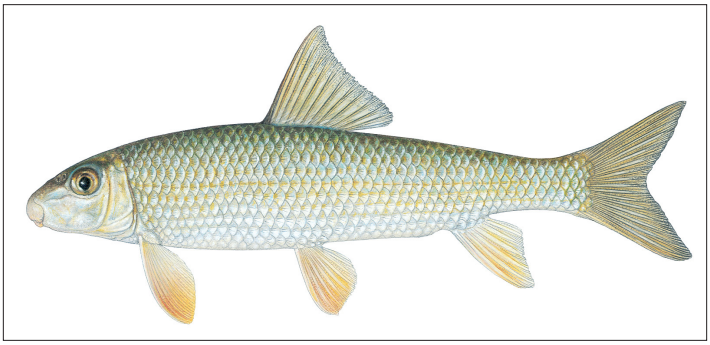

Figure 1. Juvenile Harelip Sucker. (Courtesy of Joseph Tomelleri)

Figure 2. Known distribution of the Harelip Sucker. Map modified from Lee et al. 1980.

Figure 3. Harelip Sucker specimen (85 mm SL) at the California Academy of Science. (Photos by Dave Neely)

Figure 4. Seth Eugene Meek, 1859–1914.

him on a number of fish expeditions across the continent, including one to southern Iowa in 1884. Meek resumed his statewide survey efforts including the upper Cedar River drainage of Iowa and Minnesota in 1889–1991 (Meek 1892a and b). His description makes one wonder what we have lost:

> The Cedar is, in my judgment, the finest stream in Iowa. It is only exceeded in size by the Des Moines, which it excels in swiftness of current, in being bordered to a greater extent by timber, and being fed by larger supply of springs and spring brooks. I do not think it has been more thoroughly explored than the Des Moines and its tributaries, yet. I have recorded from it a larger number of species of fishes.

He also describes the Cedar's appearance at Austin, Minnesota:

> The river is little more than a large creek. The bottom is mostly sandy, but there are occasional stretches of deep water with muddy bottom. Aquatic vegetation is scarce and confined to small patches in shallow water. At the time of our visit the volume of water had been much reduced by dry weather. Its temperature on July 25, 1890, was 71° F.

"Inspector" Bob, who for the record remains skeptical of the specimen's authenticity, also uncovered supporting evidence in memorials Meek's wife had saved proving he and not a student or associate was actually in Austin conducting the surveys. The following is part of a tribute by Percy Bentley Brunet who also provides a wonderful account or Meek's congenial and charismatic nature:

> At Austin, Minnesota, on a seining trip, we ran out of cash and went to the bank with some checks signed by Rathbun of Washington. The banker asked Meek his bank in Cedar Rapids. Then he asked the name of the president. Meek had lived there three years but the thing had gone from him like the king's dream. The banker seemed decided to refuse. Meek then told him the names of the vice-president, cashier, assistant cashier and about all the directors. Then he piled on the counter a lot of government envelopes from Washington and correspondence from Smithsonian. At last the banker said: "Well, I guess you are straight and I'll cash a check on your face." Meek thought of the president's name then at once. Meek had a knack of making his point some way in such a case. He was a personal friend by the time the check was cashed.

Admiration for Meek's altruism and passion for his work is shown in another tribute by Barton Warren Evermann:

> All of the vast amount of work which Doctor Meek did for the Government was done purely as a labor of love, because of his interest in science, and without salary. He merely desired the opportunity to carry on investigations and the only reward he asked was recognition of his work.

Back to the near present day. Dr. Jay Hatch (University of Minnesota), like Bob Jenkins, raised questions about the provenance of the Harelip Sucker specimen. Provenance is a "fundamental principle of archival science, referring to the individuals, groups, or organizations that originally created or received the items in a collection, and to the items' subsequent chain of custody" (Wikipedia Contributors 2017). An excerpt of Dave Neely's assessment follows:

> No evidence that the jar was broken in the quake, and all three specimens in the jar have metal SU tags threaded through the breast tissue. No apparent difference in preservation between the Harelip and the other two *Moxostoma*. While you could certainly question the provenance of the specimen, Bob [Jenkins] has been chasing down info on Meek's collecting efforts in the area, and there's no evidence to suggest that it's anything other than what it looks like—a Harelip that somehow got overlooked, possibly because nobody (maybe even Meek!) would have expected to see one in MN... where the heck else would *Culaea* and Harelips occur together?

Based on my personal experience with many species not found in Minnesota for decades, I find Dave Neely's explanation very plausible. Several times I have sent specimens of species I had never seen before, but fairly certain what they were, to Drs. Jim Underhill, Larry Page, and Dave Etnier for verification. These questions cannot be answered, but did Meek send his uncertain identifications to Jordan at Stanford University for his determination and did Jordan ever examine the specimens? John Olson (retired from the Iowa Department of Natural Resources) has researched many of the iconic ichthyologists who made early collections in Iowa. He believes Jordan would not have had time to look at any specimens sent to him by Meek in the early 1890s. In March 1891, he began his tenure as president of the newly opened Stanford University and likely was plenty busy with things other than fish identification. John certainly believes that Meek sent the specimens to Jordan either as he was finishing at Indiana or starting at Stanford, and that nobody looked at them until Dave Neely in 2008.

In the end, there is no smoking gun, but the extant specimen and very convincing paper trails strongly support this new locality is indeed valid. In my humble opinion, YES, Harelip Suckers once did swim in the Cedar River.

ADDENDUM

With more and more museums making their holdings available on the web, finding extant specimens from early collections has become easier. I have since found Banded Killifish from the Cedar River survey cataloged at the University of Michigan Museum of Zoology (UMMZ 248396). In addition to this significant find, Banded Killifish specimens are at the Field Museum of Natural History where Meek was an assistant curator. There are also River (*Notropis blennius*)

Table. 1. Suspected fish extirpations from the Minnesota reach of the Cedar River.

MINNOW FAMILY, CYPRINIDAE		
	Largescale Stoneroller	*Campostoma oligolepis* [2]
	Redside Dace	*Clinostomus elongatus* [3]
	Spotfin Shiner	*Cyprinella spiloptera* [1]
	Gravel Chub	*Erimystax x-punctatus* [1]
	Shoal Chub	*Macrhybopsis hyostoma* [1]
	Pugnose Shiner	*Notropis anogenus*
	Emerald Shiner	*Notropis atherinoides* [1]
	River Shiner	*Notropis blennius*
	Weed Shiner	*Notropis texanus*
	Mimic Shiner	*Notropis volucellus*
	Bullhead Minnow	*Pimephales vigilax* [1]
	Longnose Dace	*Rhinichthys cataractae* [2]
SUCKER FAMILY, CATOSTOMIDAE		
	Bigmouth Buffalo	*Ictiobus cyprinellus* [1]
	Silver Redhorse	*Moxostoma anisurum* [1]
	River Redhorse	*Moxostoma carinatum* [1]
	Black Redhorse	*Moxostoma duquesnei*
NORTH AMERICAN CATFISH FAMILY, ICTALURIDAE		
	Slender Madtom	*Noturus exilis* [2]
TOPMINNOW FAMILY, FUNDULIDAE		
	Banded Killifish	*Fundulus diaphanus*
SUNFISH FAMILY, CENTRARCHIDAE		
	Northern Sunfish	*Lepomis peltastes* [1]
PERCH FAMILY, PERCIDAE		
	Least Darter	*Etheostoma microperca* [2]
	Banded Darter	*Etheostoma zonale* [1]
	Logperch	*Percina caprodes* [1]

[1] Reported in northern Iowa downstream of Cedar River dams (barriers to upstream migration).

[2] Reported in Otter Creek (Cedar River tributary), Mower County, MN.

[3] Reported in Rose Creek (Cedar River tributary), Mower County, MN.

and Mimic shiners (*N. volucellus*) cataloged from the Austin, MN collection. The catalog numbers are FMNH 967 and 105396, respectively. Like the killifish, the shiners are the only known occurrences in Minnesota's Cedar River.

We will never know with certainty what we have truly lost in the Cedar River, but I have made an attempt to query my almost 600,000 record distribution database to draft a list of 22 possible extirpations (Table 1).

Since 1972, when the Clean Water Act went into effect, the Cedar and many other U.S. rivers have improved dramatically. Before that pivotal legislation, the late, great NANFA member and my collecting compadre, Roger Fairbanks of Hudson, WI, recounted how the Cedar looked and smelled when he returned from service in World War II. Hormel Foods (established in 1891) in Austin used the river as an open sewer, filling it with livestock offal from their slaughterhouse operations. No wonder what soon happened to the stream's aquatic life.

There are currently no plans to reintroduce any of the extirpated fishes; however, work is underway to bring back listed mussel species that are missing from the Minnesota reach using tried and tested culture techniques. A series of dams prevent glochidia-infested fish from colonizing Minnesota naturally with mussels. However, a healthy and diverse community occurs in the Cedar River at Idlewild State Park (Floyd County, IA) and target species will serve as donors in the culture efforts. The Minnesota Department Natural Resource's Center for Aquatic Mollusk Programs will lead the effort and eventually release juvenile mussels back into the Cedar from Austin to the Iowa border.

References

Lee, D. S., C. R. Gilbert, C. H. Hocutt, R. E. Jenkins, D. E. McAllister, and J. R. Stauffer. 1980. Atlas of North American Freshwater Fishes. North Carolina State Museum of Natural History. 867 p.

Meek, S. E. 1892a. The fishes of the Cedar River basin. Proceedings of the Iowa Academy of Sciences 1(3): 105–112.

Meek, S. E. 1892b. Report upon the fishes of Iowa, based upon observations and collections made during 1889, 1890, and 1891. Bull. U.S. Fish Comm. 10(1890): 217–248.

Wikipedia contributors. Harelip sucker. Wikipedia, The Free Encyclopedia. May 29, 2016, 08:52 UTC. Available at: https://en.wikipedia.org/w/index.php?title=Harelip_sucker&oldid=722632636. Accessed April 20, 2017.

Wikipedia contributors. Provenance. Wikipedia, The Free Encyclopedia. March 23, 2017, 10:35 UTC. Available at: https://en.wikipedia.org/w/index.php?title=Provenance&oldid=771759278. Accessed June 17, 2017.